Still Using Outdated Drawings? The Costly Mistake in Your Existing Building Documentation

Scan to BIM conversion transforms your existing building into a precise, data-rich digital model. By capturing real-world conditions through laser scanning and converting them into intelligent BIM models, you eliminate guesswork and gain complete confidence in your project decisions.

What We'll Cover

From Point Cloud to Intelligent Model

This guide walks through every critical phase of the scan-to-BIM workflow — from field capture to final deliverable — equipping your team with the knowledge to execute accurate, efficient, and standards-compliant building documentation projects.

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Why Scan-to-BIM?

Understanding the business and technical case for laser scanning in existing building projects

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Field scanning strategies, equipment selection, and site setup best practices

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Registration, cleaning, and preparing scan data for BIM conversion

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BIM Modeling

LOD definitions, element extraction, and quality assurance in Revit or equivalent platforms

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Deliverables & Use Cases

Final outputs, downstream applications, and project handover standards

Why Scan-to-BIM? The Case for Digital As-Built Documentation

Existing buildings represent the majority of the built environment — yet most lack accurate, current documentation. Traditional as-built drawings are often incomplete, outdated, or simply unavailable. Scan-to-BIM closes that gap by creating verified, measurement-accurate digital models directly from physical reality.

🏛️ Renovation & Retrofit

Accurate baseline models reduce RFIs, clashes, and costly on-site surprises during design and construction

📋 Compliance & Permitting

Code compliance reviews, ADA assessments, and permit documentation require verified spatial data

🏢 Facilities Management

BIM-enabled FM platforms require accurate space, system, and equipment data for lifecycle management

📐 Heritage Preservation

Detailed documentation of historic structures supports conservation planning and disaster recovery

Key Benefits at a Glance

Scan-to-BIM consistently outperforms traditional survey methods across every major performance metric — delivering faster turnaround, greater accuracy, and lower risk across the project lifecycle.

2–5mm

Scan Accuracy

Typical positional accuracy achieved by terrestrial LiDAR scanners on commercial projects

60%

Time Savings

Reduction in field survey time compared to traditional manual measurement methods

40%

Fewer Clashes

Decrease in design clashes and RFIs reported on renovation projects using verified BIM models

3x

Data Richness

More building elements captured per site visit compared to conventional survey approaches

Phase 1: Field Data Capture

Successful scan-to-BIM projects begin with disciplined field execution. **Poorly planned capture —** insufficient scan positions, inadequate target placement, or wrong equipment for the environment — creates downstream problems that no software can fully correct. A thorough pre-site assessment is essential.

Equipment Selection

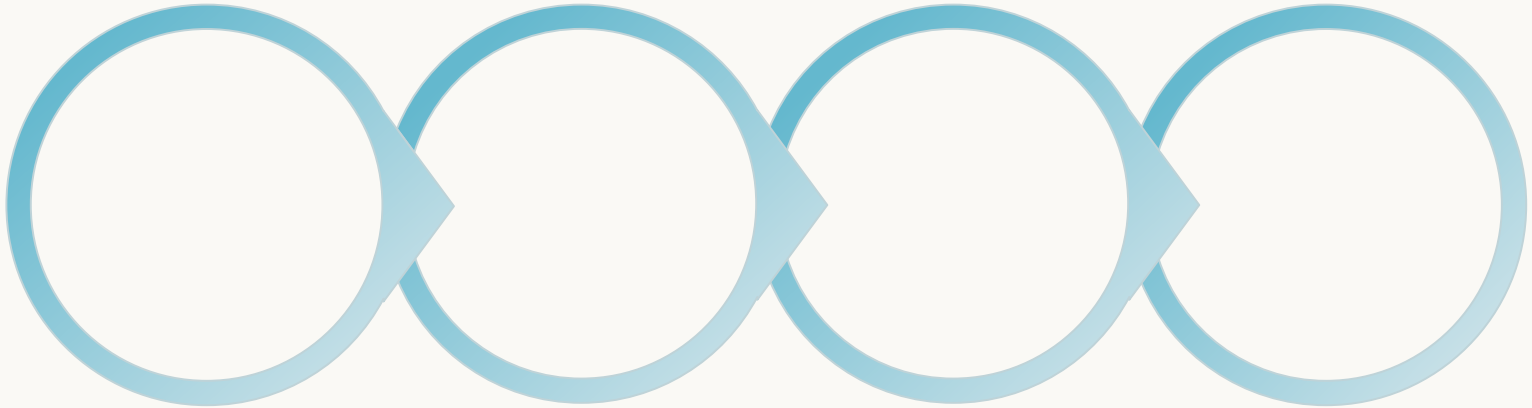
- **Terrestrial LiDAR** (e.g., **Leica RTC360**, FARO Focus) — ideal for interiors, high accuracy
- **Mobile LiDAR** (e.g., Leica BLK2GO) — fast capture for large floor areas and corridors
- **Drone LiDAR / Photogrammetry** — rooftops, facades, and inaccessible exteriors
- **Structured Light Scanners** — detail capture for millimeter-precision heritage work

Field Best Practices

- Plan scan positions to achieve minimum 30% overlap between adjacent scans
- Use spherical targets or natural feature tie-points for accurate registration
- Document all MEP systems, structural elements, and floor-to-floor heights
- Capture multiple passes for complex mechanical rooms and service shafts
- Record ambient conditions — temperature, lighting, reflective surfaces — that may affect scan quality

Phase 2: Point Cloud Registration & Processing

Raw scans from multiple positions must be stitched together into a single, unified coordinate system — a process called registration. This phase transforms raw scan data into a clean, navigable point cloud ready for BIM modeling. Quality control at this stage is critical; errors compound downstream.



Leading registration platforms include **Leica Cyclone REGISTER 360**, **FARO SCENE**, **Autodesk ReCap Pro**, and **Trimble RealWorks**. After registration, point clouds are filtered to remove noise, moving objects, and scanner artifacts before being exported in formats such as **.RCP, .E57, .LAS,** or **.PTX** for use in BIM authoring tools.

Phase 3: BIM Modeling from Point Cloud

With a registered, clean point cloud loaded into the BIM authoring environment, modelers systematically trace and reconstruct building elements — walls, **slabs, columns, beams, windows, doors, and MEP systems —** using the scan data as their reference geometry. This is where raw data becomes an intelligent, queryable model.

Architectural Elements

Walls, floors, ceilings, roofs, openings, stairs, and ramps are modeled with geometry matched to the point cloud, capturing actual as-built conditions including deviations from plumb and level.

Structural Elements

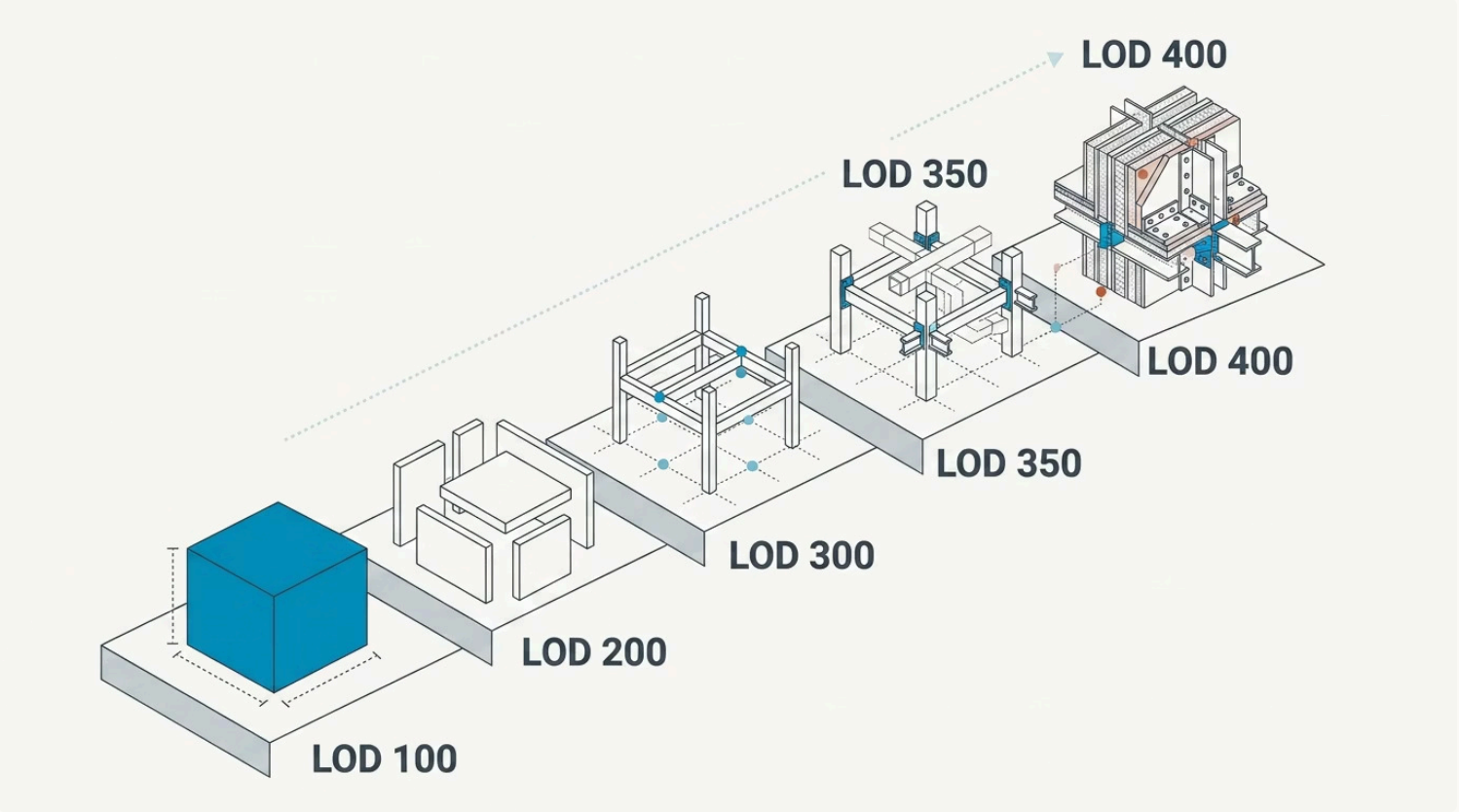
Columns, beams, slabs, shear walls, and foundations are extracted with correct section profiles, orientations, and connection details to support structural analysis workflows.

MEP Systems

Mechanical ducts, plumbing pipes, electrical conduits, and equipment are captured with routing paths, diameters, and clearances — essential for renovation clash detection and system upgrades.

Understanding Level of Development (LOD)

LOD defines how much geometric detail and embedded data each BIM element contains. Selecting the appropriate LOD for a scan-to-BIM project is a contractual and technical decision that directly impacts cost, schedule, and downstream utility. Higher LOD means more time, more cost — but also more value for complex use cases.



For most existing building documentation projects, **LOD 300** is the standard baseline. LOD 350–400 is reserved for MEP coordination or fabrication-level renovation work where maximum precision is required.

Accuracy Standards & Quality Assurance

Scan-to-BIM accuracy must be contractually defined before work begins. The industry references two primary standards that govern positional tolerances, modeling procedures, and deliverable specifications. **Without clear accuracy requirements upfront, scope disputes and costly rework are common outcomes.**

USIBD Guide for Documenting Existing Conditions

The U.S. Institute of Building Documentation defines **Level of Accuracy (LOA)** from LOA 10 (±1 inch) through LOA 50 (±1/32 inch). LOA 20 and LOA 30 are most commonly specified on commercial renovation projects.

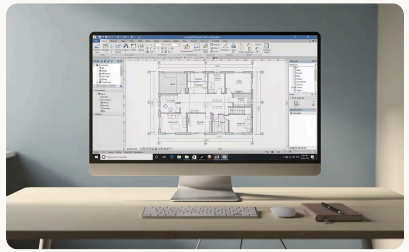
- LOA 20: ±3mm — standard interior documentation
- LOA 30: ±1mm — precision structural or heritage work

QA Checkpoints Throughout the Workflow

- Post-registration: verify scan-to-scan error is within tolerance before proceeding
- Mid-modeling: spot-check modeled geometry against point cloud at regular intervals
- Pre-delivery: run automated clash detection between modeled elements
- Final audit: independent review against scan data by a QA-designated team member
- Client sign-off: walkthrough with client against agreed LOD and LOA matrix

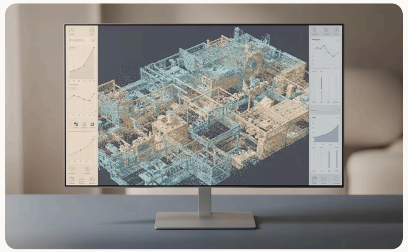
Software Ecosystem & Platform Choices

Scan-to-BIM projects span multiple software platforms across the capture, processing, and modeling phases. Tool selection should be guided by project type, team expertise, interoperability requirements, and the end client's preferred BIM environment. Most professional workflows are multi-platform by nature.



BIM Authoring

- **Autodesk Revit** — industry standard, native RCP import
- **ArchiCAD** — strong IFC export and heritage workflows
- **Bentley AECOsim** — infrastructure and complex structures



Point Cloud Processing

- **Autodesk ReCap Pro** — seamless Revit integration
- **FARO SCENE** — optimized for FARO scanner data
- **Leica Cyclone REGISTER 360** — enterprise-grade registration

Coordination & Delivery

- **Autodesk Navisworks** — clash detection and model review
- **BIM 360 / ACC** — cloud collaboration and issue tracking
- **Solibri** — model checking and IFC validation

Common Challenges & How to Solve Them

Even experienced teams encounter recurring challenges on scan-to-BIM projects. Anticipating these obstacles — and building mitigation strategies into your project plan — is the hallmark of a mature, reliable workflow.

Occluded or Missing Data

Furniture, equipment, and tight spaces create scan shadows.
Solution: Plan additional scan positions during site mobilization; use handheld or mobile scanners for confined areas. Flag data gaps in the point cloud before modeling begins.

Reflective & Transparent Surfaces

Glass, mirrors, polished floors, and metal cladding cause scan noise and false returns.
Solution: Apply matte spray on critical surfaces temporarily; filter noise in processing software; cross-reference with photographic record.

As-Built vs. As-Designed Deviations

Buildings rarely match their original drawings.
Solution: Treat the point cloud — not the existing drawings — as the single source of truth. Document all deviations and flag them as change records in the BIM model.

Scope Creep & LOD Misalignment

Clients often request additional detail mid-project.
Solution: Define LOD and LOA requirements in the project brief and contract. Use a clear scope matrix that maps deliverables to fee milestones.

Deliverables, Use Cases & Downstream Value

A well-executed scan-to-BIM project produces deliverables that serve far beyond the immediate documentation need. The true ROI of scan-to-BIM is realized when the model becomes a living asset — updated across the building lifecycle and used across multiple disciplines and platforms.

As-Built Drawings

2D plans, sections, and elevations extracted directly from the BIM model — fully coordinated and dimensionally verified against scan data

Clash Detection Reports

MEP coordination clash reports generated in Navisworks, resolving conflicts before construction begins — reducing RFIs by up to 40%

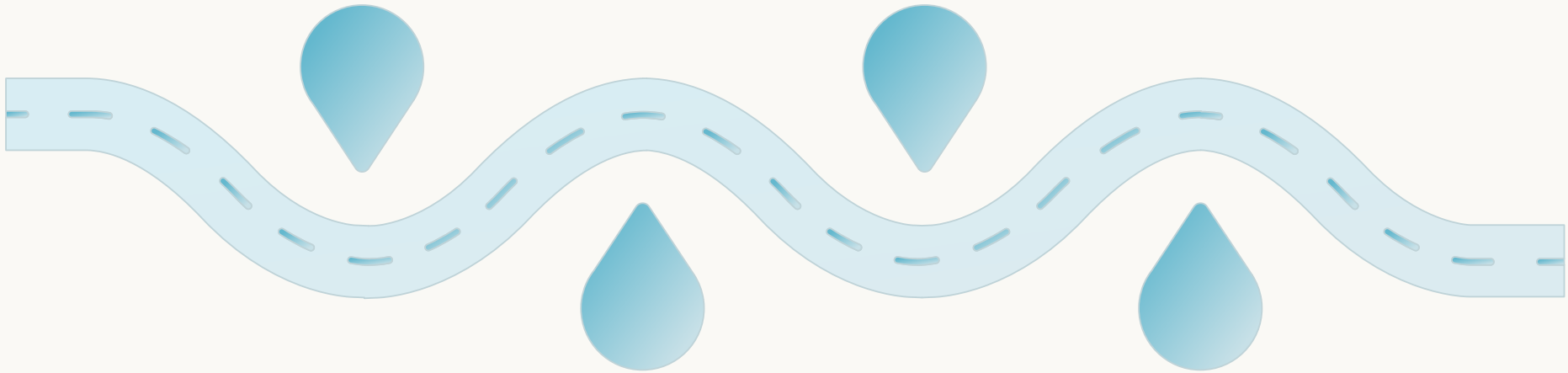
Energy Analysis Models

Scan-derived BIM models feed directly into energy simulation tools for retrofit feasibility studies and LEED/ASHRAE compliance analysis

FM & Digital Twin

COBie data exports and IFC-compliant models integrate with CMMS and digital twin platforms for ongoing operations and maintenance

Scan-to-BIM Workflow: End-to-End Summary



Every successful scan-to-BIM project follows this disciplined sequence — from pre-site planning through to final model handover. Each phase feeds directly into the next, meaning that investment in quality at the early stages pays dividends all the way through to the final deliverable and beyond into facilities management.

Ready to Digitize Your Building Portfolio?

Whether you're documenting a single heritage structure, managing a campus-wide renovation program, or building a facilities management database — our scan-to-BIM specialists are ready to scope, plan, and deliver your project to the highest accuracy standards.

📞 Request a Consultation

Speak with a **scan-to-BIM specialist** to assess your project requirements, define LOD/LOA standards, and receive a tailored workflow recommendation.

📄 Download Our Standards Guide

Access our free reference document covering LOD definitions, LOA tolerances, software recommendations, **and sample contract language for scan-to-BIM projects.**

🚀 Start Your Pilot Project

Begin with a single floor or building wing to validate the workflow, demonstrate **ROI to stakeholders, and build internal team competency before scaling.**